

UREA FORMALDEHYDE FOAM INSULATION

IN MANITOBA

by

DOUG HACKING

Manitoba Housing and Renewal Corporation

July 24, 1981.

HAZARDOUS PRODUCTS BOARD OF REVIEW
ON UREA FORMALDEHYDE FOAM INSULATION

EXHIBIT NO. 18

1. Introduction

The Manitoba Housing and Renewal Corporation started following up complaints from homeowners in respect of insulation in 1975. Subsequently, the Inspection Division, of which I am Co-ordinator, was assigned the Manitoba Home Insulation Loan Program in 1977 with a mandate not only to do spot checking in cases where we received a number of complaints about a particular company but also to do inspections arising from homeowner complaints. We also do inspections arising from complaints received by the Provincial Consumer and Corporate Affairs Branch of the Manitoba Government.

2. Inspections of UFFI Homes

A. General

Our involvement with urea formaldehyde foam insulation (or UFFI) and with formaldehyde emission in particular originated after the November 1979 Marketplace program on CBC. This publicity has prompted many homeowners in Manitoba to search for knowledge and advice. Although some simply want assurance that the UFFI in their house is safe, the majority are seeking knowledge and advice on "what to do".

It was then that the Manitoba government set up machinery to test homes where owners felt that they might have a problem. The Inspection Division works in close contact and cooperation with the Environmental Control Branch of the Consumer and Corporate Affairs Department. The Environmental Control Branch surveys the house for formaldehyde gas using the Draeger Multi-gas Detector Pump and formaldehyde tubes. Copies of the tests are then sent to our Inspection Division. All readings of formaldehyde levels in this report were taken from these reports.

Whenever tests recorded readings around 0.5 ppm or higher our inspection staff would follow up by checking the installation of the UFFI for approved application procedures and the areas in which the formaldehyde gas is able to penetrate into the living space of the house. Information and advice is given to the homeowner, pertinent to his particular house, in either removing the foam or reducing the amount of formaldehyde gas.

Since August 1977, when many of the UFFI manufacturers received CMHC acceptance, I have personally inspected well over 200 homes. Companies installing UFFI under the Manitoba Homeowners' Tax and Insulation Assistance Act were required to follow the CGSB provisional

standards of May and December 1977 outlining the requirements of the product and its installation. My experience shows that in many cases this was not done.

Improper installation was a major problem. I have seen many cases where UFFI has been installed in attics, flat roofs, cathedral ceilings and knee-wall areas contrary to the standard. I have also seen it in basements, even to the point of one installer spraying it on an open basement wall. As well, I have seen attempts to install it in brick walls and walls that already had some form of insulation in them.

Our inspections have also revealed shrinkage of the foam. In one house we found up to 50% shrinkage while in many others there was well over the 7% shrinkage allowable under the regulations. Such shrinkage permits cold air to circulate around the foam seriously reducing its value as an insulator. I have also seen homes where a portion of the foam had turned to powder and was in small piles at the bottom of the wall.

B. Formaldehyde testing up to mid-June 1981

Another serious problem we have found is the presence of formaldehyde gas in the houses. It is interesting to note that even four to five years after installation

the tests performed are showing levels from 1.5 ppm in the room air to as high as 10 ppm in the wall cavity. The majority of homes tested had no detectable level of formaldehyde according to the test apparatus used. The Draeger Multi-gas Detector Pump and formaldehyde tubes are only sensitive from 0.5 ppm to 10.0 ppm. Below 0.5 ppm the tubes may indicate a trace.

Usually where readings are under 0.5 ppm comprehensive information is given over the telephone to those who request it. However, if chronic ailments have persisted for some time the home inspection program is done. Draeger readings of 0.5 ppm or higher are dealt with in the home with the homeowners and complete information is supplied. Where the removal of the UFFI is an easy procedure (such as in attics), we recommend that the homeowner consider taking it out.

As of the middle of June 1981, the Environmental Control Branch had tested 140 homes. The following is a summary of information supplied to them by the homeowners themselves:

(1) 93 had essentially negative readings (i.e.: The Draeger tubes were unable to pick up any formaldehyde).

In these homes:

24 - Had no known medical problems

- 23 - mentioned respiratory problems
 - 6 - complained of sore eyes and throat irritations
 - 15 - sore eyes and throat dryness
 - 6 - nose irritation
 - 12 - sore eyes, headaches
 - 2 - complained of dizziness, skin irritation
 - 5 - complained that they just did not feel well
- 93

(2) 18 homes had from trace to under 0.5 ppm. In these homes:

- 6 - no known medical problems
 - 4 - respiratory complaints
 - 2 - respiratory complaints and sore eyes
 - 1 - sore eyes and headaches
 - 1 - nausea and headaches
 - 4 - sore eyes, throat and headaches
- 18

(3) 13 homes tested had readings from 0.5 ppm to under 1 ppm. In these homes:

- 4 - indicated no medical problems
- 1 - complained of headaches
- 1 - headaches and nose irritation
- 2 - sore eyes
- 1 - sore eyes and fatigue
- 1 - respiratory
- 1 - sore eyes and respiratory problems

- 6 -

1 - nose irritation
1 - nose bleed

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(4) The remaining 16 homes tested showed 1 ppm to 2 ppm. In these homes:

3 - had no known medical problems
6 - respiratory problems
1 - respiratory problems and sore eyes
1 - nose bleeds and sore eyes
2 - respiratory problems and skin rash
3 - sore eyes, throat irritation

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It would appear then, that of 140 homes tested, 79.4% showed readings less than 0.5 ppm, 9.2% showed readings between 0.5 and 1 ppm and 11.4% showed readings between 1 and 2 ppm. Therefore, over 20% of the 140 homes tested had readings at 0.5 ppm and above. Of the 140 homes, only 37, or 26.4% indicated no health problems.

C. Formaldehyde testing since mid-June 1981

As the heat of summer progresses, the number of requests for home testing and inspection multiplies. As a result,

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the Environmental Control Branch is now sending us only those inspection reports where they feel there may be a real problem. We have now received an additional 34 reports:

(1) 3 had essentially negative readings.

In these homes:

- 1 - Had no medical problem
- 1 - Complained of sore throat and skin rash
- 1 - Complained of skin rash
- 3

(2) 4 homes had from trace to under 0.5 ppm. In these homes:

- 2 - Had no medical problems
- 1 - Had chronic bronchitis
- 1 - Had skin rash
- 4

(3) 9 homes had from 0.5 ppm to 1 ppm. In these homes:

- 3 - Had no medical problems
- 1 - Complained of eye irritation
- 1 - Skin rash
- 1 - Had eye irritation, sore throat, chest pains and 1 resident of home had an allergy
- 1 - Complained of headaches and respiratory problem
- 1 - Had runny nose and headaches
- 1 - Respiratory problems

(4) The remaining 18 homes tested showed 1.0 ppm and higher

- 4 - Had no known medical problems
- 1 - Complained of coughing
- 2 - Complained of headaches
- 3 - With sore and watery eyes
- 1 - Complained of headaches and colds
- 1 - Complained of watery eyes and breathing difficulties
- 1 - Complained of eye irritations and nose bleeds
- 1 - Complained of sore throat, eye irritation and runny nose
- 1 - Complained of headaches, respiratory problems and runny eyes
- 1 - Complained of nausea, headaches, nose bleeds and eye irritation
- 1 - Complained of nose bleeds, skin rash and respiratory problems
- 1 - Complained of respiratory problems, runny nose and
18 sore eyes

It would appear, then, that of the 34 problem homes recently tested, 20.5% showed readings less than 0.5 ppm, 26.5% showed readings between 0.5 ppm and 1.0 ppm and 53% 1.0 ppm and more. Of the 34 homes tested, only 10 or 29.4% indicated no health problems.

3. Conclusion

In conclusion, my own opinion of the product is that as long as the material is mixed at the work site and is therefore affected by variables such as temperature and human error at the time of installation there will be problems. Furthermore, from my observations of houses with UFFI in Manitoba, it would appear that very little attempt was made by industry to follow the CGSB standards which were mandatory for companies insulating under the Manitoba Homeowners' Tax and Insulation Assistance Act. Finally, we believe that a sufficient number of recorded break-downs in the unstable urea formaldehyde foam imposing health hazards to homeowners warrants the continued ban on the use of urea formaldehyde foam as insulation for homes.

CASE HISTORY 1: Mrs. P.

Formaldehyde Gas - 7.0 ppm

- (a) Soon after the installation of urea formaldehyde foam insulation in their house the family began complaining of morning headaches and sore eyes. Reports in the news media alerted Mrs. P. who contacted the Provincial Consumers Bureau.

The Environmental Control Branch conducted tests with the Draeger Multi-gas Detector and formaldehyde tubes which gave a reading of 7 ppm in the air space of the dwarf-wall attic.

The Environmental Control Branch informed the Insulation Inspection Division of MHRC of their finding and suggested an inspection to determine if proper installation methods were used.

- (b) This inspection revealed an unapproved application of UFFI, i.e. in an attic area where the heat and humidity of summer may cause a breakdown of the material.

Upon entering this attic area the inspectors experienced effects similiar to that from tear-gas: eyes smarting and watering and smarting of sweaty body areas. After a maximum of two minutes the area had to be vacated and left open to ventilate. The reaction of one inspector, who handled the foam, persisted through the night with a swelling of the hands and face. He was forced to see his doctor the following morning who gave him some pills to relieve the swelling.

- (c) The installation contractor was informed of the insulation problems. UFFI was eventually completely removed from the house which was then re-insulated with mineral wool batts by the contractor.
- (d) The removal of the UFFI from the house reduced the formaldehyde fumes to a level which eliminated the symptoms suffered by Mrs. P.'s family.

CASE HISTORY 2: Mrs. B.

Formaldehyde Gas - 1.5 ppm

- (a) Since the installation in September 1975 of urea formaldehyde foam insulation in the attic and walls, Mrs. B.'s lung cancer symptoms have seemed to intensify. Mr. B., who is a salesman and away from home for periods of time, experienced headaches every morning when at home, but no such headaches occurred when he was away. An electronic air cleaner attached to the heating system and an electronic room air purifier did not help.

- (b) Mrs. B. contacted the Environmental Control Branch of the Provincial Consumer and Corporate Affairs and Environment Department to test the air in their house to determine if an airborne material was contributing to their health problems.

Draeger tests revealed negative results for formaldehyde and for ozone within the living space of the house. However, tests in the attic showed 1.5 ppm of formaldehyde gas.

- (c) The Insulation Inspection Division of MHRC were notified by the Environment Control Branch to check installation methods of the insulation. The inspector found the prescribed method was used to insulate the walls but attic insulating was contrary to the Regulations in force at the time of the inspection.
- (d) When it was established that the installing contractor was no longer in business, letters were sent to Government regulating departments and to the manufacturer of the foam insulation used.

This correspondence resulted in the manufacturer paying for the removal of the UFFI and re-insulating the attic with mineral wool batts.

- (e) Draeger tube tests were again completed by the Environmental Control Branch with negative results for formaldehyde gas.

Mrs. B. writes that for the first time in four years, her husband no longer wakes with headaches, and that she no longer has as severe attacks of coughing.

- (f) For well over four years the urea formaldehyde foam insulation had been giving off formaldehyde gas at a level sufficient to irritate Mrs. B. and her husband. Even though the UFFI was left in the walls the formaldehyde gas level within the house is now reduced to an ineffectual level.

CASE HISTORY 3: Mr. S.

Formaldehyde Gas - 2.0 ppm

- (a) Mr. S. was disturbed by the continuing odour and his ill health in his house since the insulation of the walls with UFFI. (Details of ill health not recorded).

Persistent complaints by Mr. S. to the new owners of the insulating company prompted their request for an inspection and mediation by the inspection Division of MHRC.

- (b) The Environmental Control Branch of the Consumer and Corporate Affairs and Environment Department were alerted to conduct a survey of Mr. S.'s house. Formaldehyde gas was recorded showing a level of 2.0 ppm at a wall crack in the bedroom, despite the fact that the foam appeared to be properly installed and showed very little shrinkage.
- (c) The Inspection Division and the insulating company met and discussed with Mr. S. various ways and means of reducing and controlling the level of the formaldehyde gas in the house. Continued discussions eventually led to the insulating company and their insurance coverage absorbing the costs of \$2,500.00 for the removal of the foam and the appropriate repairs inside the house. The insulating company did not acknowledge responsibility but proceeded on a public relations basis.
- (d) Many bridges were crossed in achieving the results requested by Mr. S. including the use of legal counsel. Mr. S. has recently informed us that he no longer suffers from sore eyes and breathing difficulties since the removal of the UFFI.

CASE HISTORY 4: Mr. A.

Formaldehyde Gas - 0.7 ppm

- (a) Within a month after the installation of urea formaldehyde foam insulation in the basement walls of his house, Mr. A. contacted the Provincial Consumers Bureau. His complaint was about the strong odour immediately after the foam was installed and, ever since, both he and his wife were suffering from eyes watering and sore throats. The Consumers Bureau referred the information to the Environmental Control Bureau.
- (b) Tests for formaldehyde gas were conducted throughout the house on two separate occasions. A level of 1.5 ppm formaldehyde gas was recorded in the basement near an electrical outlet. Formaldehyde gas levels were lower in the living area of the main and second floor, 0.7 ppm and 0.5 ppm. The Environmental Control Insulation Inspection Division of MHRC, (Manitoba Housing and Renewal Corporation), went to investigate installation procedures.
- (c) Observations by MHRC inspector were; noticeable odour, lack of vapour barrier and installation of urea formaldehyde foam below grade. The insulation contractor did not follow approved regulations. The contractor was informed of the formaldehyde gas resulting from his installation of the foam.
- (d) In conjunction with his insurance company the contractor removed the offensive foam and replaced it with fiberglass insulation. The last word from Mr. A. is that their symptoms have subsided since the removal of the UFFI and they are now again enjoying the comforts of their home.

CASE HISTORY 5: Brandon

Formaldehyde Gas - to 10 ppm

- (a) The Manitoba Housing and Renewal Corporation was contacted by the Children's Aid to inspect a nursery school they were operating. In November 1980 UFFI had been installed into the flat roof of this two storey, 16 room building against regulations. The formaldehyde emission was so severe that the school had to be evacuated. As well, foam had seeped into the fire safety system causing several false alarms, with the result that the system had to be shut down.

- (b) Upon entering the building, a strong odour of formaldehyde gas could be detected, especially on the second floor. Tests done with the Draeger Multi-gas Detector found 1.5 ppm in the classroom area; 4.0 ppm in the closet on the second floor and 10.0 ppm in the sample foam taken from the school.
- (c) The Children's Aid are now in the process of removing the UFFI at a cost of \$27,000.00. Workmen removing the foam are suffering from skin rash, watery eyes and runny noses despite the fact they are wearing masks and eye protection.

CASE HISTORY 6: Mr. D. Formaldehyde Gas - to 10.0 ppm

- (a) Mr. D. was contemplating re-siding his home which had previously been insulated with UFFI in 1976. On removing the old siding and portions of the fibreboard, he found excessive shrinkage. Mrs. D. had been experiencing some skin reaction since the home was insulated and due to recent information on formaldehyde emission and because of the excessive shrinkage decided to have the house tested. Formaldehyde tests revealed a small trace inside the home but tests of foam in wall cavities indicated 10 ppm. The Environmental Department contacted The Manitoba Housing and Renewal Corporation for their opinion on Mr. D.'s house.
- (b) Their inspection revealed that the home had previously been insulated with R7 Mineral Wool paperback batts. The foam company attempted to insulate by inserting the hose into paperback insulation instead of insulating on the exterior of the batt. As Mr. D. was planning to install an insulation with a Polyurethane backing, our inspector suggested that he would probably be wiser to remove the foam and install a batt type insulation as the new siding could provide a vapour barrier preventing the formaldehyde gas from escaping outwards.

CASE HISTORY 7: Mrs. A.

Formaldehyde Gas - 1.0 ppm

- (a) Mrs. A. contacted the Environmental Branch to have her one and a half storey home tested for formaldehyde gas. Mrs. A., who is under doctor's care, had been experiencing headaches, respiratory problems and runny eyes and her allergist indicated that it could be coming from the formaldehyde gas. The Draeger Multi-gas Detector indicated 0.7 ppm to 1.0 ppm in the second floor bedroom. The Manitoba Housing and Renewal Corporation were contacted by the Environmental Branch to investigate.
- (b) Our inspection revealed that UFFI had been installed in the slopes and roof area of Mrs. A.'s home in the fall of 1979 against regulations. Due to Mrs. A.'s medical problems, inspection staff have recommended its removal and proper insulation installed.

CASE HISTORY 8: Mr. C.

- (a) Mr. C. contacted The Manitoba Housing and Renewal Corporation complaining that although he had insulated his wall the year before, he was getting frost spots in several areas of his house, especially along the walls at floor level which he had never had before.
- (b) Mr. C. had paid an insulating company to remove the wood shavings in the wall and then to insulate with UFFI. The Manitoba Housing and Renewal Corporation inspection staff removed a row of siding at the bottom of the wall and discovered excessive shrinkage leaving empty spots. Mr. C. is attempting to negotiate some type of remuneration with the insulating company to have all the foam removed.

Although it appeared that the company had followed all regulations, the UFFI has broken down.

CASE HISTORY 9: Mr. S.

Formaldehyde Gas - 4 ppm

- (a) In the process of re-siding, Mr. S. discovered that the UFFI installed in his house in 1976 showed excessive shrinkage. He then contacted the Environmental Branch to test for formaldehyde gas. The Draeger Multi-gas test showed no trace present in the living area but even though the exterior of the wall cavity had been open for several days, it still tested at 4 ppm. The Environmental Branch contacted MHRC to investigate.

- (b) The MHRC inspection revealed that there appeared to be a breakdown of the UFFI, as there was excessive shrinkage and in places the foam had turned to powder and was lying in the bottom of the wall cavity.

CASE HISTORY 10: Mr. C. Formaldehyde Gas - 7 ppm

- (a) Mr. C. contacted the Environmental Control Branch to have his house tested for formaldehyde gas. The Draeger Multi-gas Detector indicated levels of 1.7 - 7 ppm in the basement. The Environmental Control Branch then contacted MHRC for follow-up inspection.
- (b) The MHRC inspection revealed that UFFI had been installed in the pre-finished basement walls, contrary to CGSB standards.
- (c) Mr. C. has reduced the lingering effects of formaldehyde gas in the air of his house by air circulation and filtration systems installed because of the offensive odour noticed after the installation of the UFFI.
- (d) However, the continuing release of formaldehyde gas as shown on the Environmental Control report indicates, in our opinion, that the UFFI will have to be removed.
- (e) Mr. C. has experienced breathing difficulty and watery eyes since the foam was installed. When the house has been closed for a few days, the odour is quite strong. These facts further exhibit positive reasons for the removal of the foam.

